

SECTION VI.—WEATHER AND DATA FOR THE MONTH.

EXCESSIVE PRECIPITATION AT OKLAHOMA, OKLA.

In the *Meteorologische Zeitschrift* for April, 1914, Prof. Julius v. Hann draws attention to what he believed to be an unusually heavy rainfall of brief duration at Oklahoma, Okla., between 3:35 a. m. and 6:10 a. m., July 1, 1913.¹ Unfortunately the monthly table of accumulated excessive precipitation was misinterpreted in this case by Prof. Hann.

When this table, now called Table II, published monthly in this REVIEW for many years past, was devised it was found impracticable to make it sufficiently wide to accommodate on one line the record of accumulated falls that continued at an excessive rate for several hours. It was decided that in the latter case the record should be broken at the end of each 50 minutes, the accumulating amounts being recorded on successive lines until the excessive rate ended.

In the light of this explanation of the table it is clear that the entry for Oklahoma, Okla., under July 1, 1913, in the second line, 5-minute column (1.26 inches), represents the accumulated fall for 55 minutes; and that in the last line for Oklahoma, the entry in the 5-minute column (4.19 inches) represents the accumulated or total fall for 155 minutes during which the falls had been at an excessive rate as measured by the scale of excessive rates given under the heading "Description of Tables and Charts" (below p. 401). The fall for the last 5-minutes period was only 0.13 inch (3.3 mm.).

The above statement is published here because the erroneous interpretation referred to above is being widely published and attributed to this REVIEW, by both technical and popular European journals. Journals that have printed this error are requested to give equal prominence to this correction.—[C. A. Jr.]

THE WEATHER OF THE MONTH.

By P. C. DAX, Climatologist and Chief of Division.

Pressure.—The distribution of the mean atmospheric pressure over the United States and Canada, and the prevailing directions of the winds, are graphically shown on Chart VII, while the average values for the month at the several stations, with the departures from the normal, are shown in Tables I and III.

The mean barometric pressure for the month as a whole was above the normal over the entire country, save in New England, the interior of Virginia and North Carolina, and locally in the middle Missouri Valley, where the means were slightly less than normal. The more marked plus departures appeared in the middle and west Gulf States, extending into eastern New Mexico, and in the upper Lake region and upper Mississippi Valley. However, as a rule the departures from the normal were not large, the means in most districts being near the normal values.

During the first few days of the month a moderate high pressure area occupied the central and eastern districts, which passed to sea about the 3d, and was followed by a trough of low pressure, extending on the morning of the 4th from the Lake region westward to the northern mountain districts. By the following day a high pressure area of considerable magnitude overspread the Hudson Bay district and slowly moved southward during the next few days to the southeastern States.

On the 8th–10th a moderate depression moved eastward over the northern border States and Canadian Provinces, after which no barometric changes of consequence occurred until about the middle of the month, when a rather extensive area of high pressure advanced from the Canadian Northwest, overspread the central and northern districts during the following few days, and passed to sea about the 18th. From the 22d to the 25th relatively high pressure obtained over the southern States east of the Rocky Mountains, and from the last named date to the close of the month a disturbance of considerable energy moved across the central and northern districts from the Pacific Ocean to the Canadian Maritime Provinces, with considerable diminution in intensity with approach to the ocean.

The distribution of the highs and lows for the month was favorable for the occurrence of southerly winds as prevailing direction over most districts east of the Rocky Mountains, while the prevailing directions to the westward were variable.

Temperature.—The month opened with moderately warm weather over all parts of the country, and during the first few days a warm area advanced slowly eastward from the Canadian Northwest, reaching the great valleys by the 4th. At the same time cool weather set in over the far West and overspread the mountain districts during the next few days, with temperatures as low as or lower than had been recorded for many years at the same period, and with local snows and frosts at exposed points. About this time much cooler weather obtained over the northern districts from the upper Mississippi Valley eastward, but to the southward temperatures continued quite high.

About the 8th high pressure over the northeast and a moderate depression on the Middle Atlantic coast resulted in a marked fall of temperature in New England and the Middle Atlantic States. However, temperatures continued high over interior districts, but were moderate and below normal from the Rocky Mountain region westward. About the 11th the cool weather in the northeast gave way to much higher temperatures, while warm weather continued in central and southern districts, with readings as high as or higher than ever before recorded for the period of the year at many points on the 10th or 11th. By the middle of the month temperatures were everywhere moderate, except in the south, where they continued high, but during the next few days the warm weather there was displaced by more moderate temperatures, and about the 20th the weather was unusually cool for the season in the Lake region.

¹ See Monthly Weather Review, Washington, July, 1913, 41 : 1128.

About the 22d unusually cold weather obtained in portions of the mountain districts, especially in Wyoming and adjoining States, where heavy local frosts occurred. This cold area did not, however, advance eastward to any marked extent and in a day or two it had largely dissipated, but in the meantime there was a general warming up over eastern districts and temperatures had again become high in the south. During the last few days of the month temperatures were low for the season over northern districts from New England westward to the Rocky Mountains, but high temperatures continued in the south and the weather had become warmer in the far West.

The mean temperature for the month was above the normal over all sections from the Rocky Mountains eastward, save along the northern border and in New England, where minus departures occurred. The plus departures ranged from 3° to 6° in all central and southern districts east of the Plains States. To westward of the Rocky Mountains the month was everywhere cooler than the average, except in the extreme southwest where the mean temperature was slightly above the normal, the more marked minus departures occurring in the central and northern Plateau region and along the northern coast of California.

The extremes of temperature during the month were frequently quite marked, especially the maximum readings in central and southern districts east of the Plains States about the 10th and 12th, and again about the 24th to 27th, when they were frequently above 100° and at numerous points equaled or exceeded any previous record for June. Minimum temperatures were quite low at points in the Lake region on the 17th and the 20th, and along the California coast during the last decade of the month.

Precipitation.—Unsettled, showery weather prevailed over the more western districts during much of the first week of the month, and from the 4th to the 9th precipitation was quite general over all northern districts from the Rocky Mountains eastward to New England. From the 8th to the 15th precipitation was generous over the Missouri and upper Mississippi valleys and portions of the middle and northern Rocky Mountain region and locally in the lower Mississippi Valley, the east Gulf and South Atlantic States, with some heavy falls in portions of the upper Mississippi Valley and northern Plains States. From the 15th to the 20th the rainfall was mostly of a local character, but large areas of the country received generous amounts, especially the Lake region, central and western Texas, portions of the Mountain districts and locally in the southeastern States, but considerable areas in the middle Mississippi and Ohio valleys and Middle Atlantic States received little or no precipitation.

During the last decade of the month the rainfall was above the normal and in some cases excessive over portions of the Middle Atlantic States and all northern districts from the Lake region westward to the Pacific coast, the falls in portions of North Dakota, Minnesota, and Wisconsin being especially heavy; but over the central and southern sections little or no rain occurred during the decade.

For the month as a whole the precipitation was heavy, ranging from 6 to 8 inches, in the upper Mississippi Valley and the northern Plains States, and was above the normal in all central and northern districts from the Lake region westward to the Pacific, save in Missouri and portions of adjoining States, Wyoming, and the far Northwest. In all other districts the amounts were quite generally below the normal, with some marked deficiencies in the central and eastern districts, and to the

southward. Little rain occurred during the month in the middle Mississippi Valley and southwestward over Oklahoma and much of Texas, and the total falls were also light in portions of the Middle Atlantic States.

For the season, March 1 to the end of June, the precipitation was decidedly below the normal over all central and southern districts east of the Rocky Mountains, save in Texas, the minus departures ranging from 4 to 8 inches, and less than the average amount was likewise received in the Pacific Coast States and over much of the northern mountain region. The total for the season was above the normal in much of the Lake region, the northern Plains States, the central and southern mountain districts, and in Texas.

GENERAL SUMMARY.

The more noteworthy features of the month's weather were the heavy rainfall in the northern districts from the Lake region westward to and including the northern mountain States, and the scanty amounts and excessive temperatures over the central and southern sections east of the mountains. The weather was favorable for maturing winter wheat and for harvesting where cutting had begun, as well as for rapid growth in the spring wheat belt, but somewhat too much moisture was received in portions of the latter region. In most western and northern districts the month's weather favored corn, hay, and oat growth, but in the Ohio Valley and to the southward the hot, dry weather was unfavorable, and oats and hay were cut short in many sections and the growth of corn was retarded and the crop much damaged in the more southern districts.

In the cotton belt the month was exceeding dry and hot, despite which early planted cotton made good growth, but the trucking interests of the South suffered severely from lack of moisture.

The precipitation during the month was sufficient to keep the ranges of the West generally in good condition, but at the close more moisture was needed in many central and southern sections.

Over the Pacific Coast States the weather of the month was generally favorable, but some damage to wheat occurred by frost near the close in the northern highlands.

Maximum wind velocities, June, 1914.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
		<i>Mi./hr.</i>				<i>Mi./hr.</i>	
Bismarck, N. Dak.	25	53	e.	Nashville, Tenn.	12	52	nw.
Charleston, S. C.	9	58	ne.	Do.	15	65	nw.
Cheyenne, Wyo.	20	50	w.	Do.	25	62	sw.
Do.	26	58	w.	New York, N. Y.	16	55	nw.
Columbus, Ohio.	4	55	nw.	Do.	20	58	nw.
Do.	26	54	sw.	Parkersburg, W. Va.	22	57	nw.
Devils Lake, N. Dak.	6	50	sw.	Pierre, S. Dak.	26	56	w.
Duluth, Minn.	4	54	ne.	Do.	27	50	nw.
Do.	27	62	ne.	Pittsburgh, Pa.	27	53	nw.
El Paso, Tex.	1	58	se.	Point Reyes Light, Cal.	2	52	nw.
Grand Junction, Colo.	6	55	sw.	Do.	3	73	nw.
Huron, S. Dak.	3	58	nw.	Do.	4	94	nw.
Lincoln, Nebr.	14	52	nw.	Do.	5	67	nw.
Minneapolis, Minn.	18	56	n.	Do.	11	50	nw.
Do.	23	67	nw.	Do.	20	76	nw.
Modena, Utah.	5	50	n.	Do.	21	60	nw.
Do.	24	52	sw.	Do.	22	61	nw.
Do.	25	51	sw.	Do.	16	52	nw.
Mount Tamalpais, Cal.	4	74	nw.	Providence, R. I.	25	50	sw.
Do.	5	67	nw.	Rapid City, S. Dak.	10	50	sw.
Do.	6	68	nw.	St. Paul, Minn.	23	56	sw.
Do.	10	52	nw.	Do.	23	56	nw.
Do.	18	50	sw.	Sioux City, Iowa.	23	54	s.
Do.	23	53	nw.	Do.	27	53	w.
Do.	27	58	w.	Valentine, Nebr.	12	56	sw.
Mount Weather, Va.	29	56	nw.	Wichita, Kans.	5	50	nw.
Do.	30	56	nw.	Williston, N. Dak.	3	50	n.

Average accumulated departures for June, 1914.

Average accumulated departures for June, 1914—Continued.

Districts.	Temperature.			Precipitation.			Cloudiness.		Relative humidity.	
	General mean for the current month.	Departure for the current month.	Accumulated departure since Jan. 1.	General mean for the current month.	Departure for the current month.	Accumulated departure since Jan. 1.	General mean for the current month.	Departure from the normal.	General mean for the current month.	Departure from the normal.
New England.....	62.1	-1.0	-6.9	2.21	-0.90	-2.00	5.3	+0.1	70	-9
Middle Atlantic.....	70.9	+0.8	1.1	2.84	-0.90	-2.70	5.1	+0.1	63	-10
South Atlantic.....	79.3	+3.3	+2.9	3.09	-1.80	-7.90	5.0	0.0	74	-4
Florida Peninsula.....	81.6	+1.1	+3.1	2.78	-4.00	-6.10	4.6	-0.6	75	-5
East Gulf.....	82.8	+4.7	+2.0	2.85	-1.70	-6.10	4.6	-0.7	70	-5
West Gulf.....	82.4	+3.4	+2.2	0.73	-3.00	-5.40	3.4	-0.9	69	-7
Ohio Valley and Tennessee.....	76.5	+3.3	+0.8	2.85	-1.40	-6.40	4.7	-0.3	63	-7
Lower Lakes.....	66.1	-0.9	-6.2	2.51	-1.10	-0.40	4.2	-0.1	67	-4
Upper Lakes.....	62.5	-0.1	+1.3	4.75	+1.40	+0.90	5.3	-0.2	71	-2
North Dakota.....	63.2	-0.5	+10.6	7.84	+4.20	+2.90	8.5	+0.4	74	+6

Districts.	Temperature.			Precipitation.			Cloudiness.		Relative humidity.	
	General mean for the current month.	Departure for the current month.	Accumulated departure since Jan. 1.	General mean for the current month.	Departure for the current month.	Accumulated departure since Jan. 1.	General mean for the current month.	Departure from the normal.	General mean for the current month.	Departure from the normal.
Upper Mississippi Valley.....	73.6	+2.7	+9.5	4.56	+0.20	-3.30	5.1	+0.1	66	-4
Missouri Valley.....	74.6	+3.7	+14.3	5.88	+1.50	-0.80	4.4	-0.5	68	+1
Northern slope.....	61.9	-0.2	+13.9	2.70	+0.40	-1.10	5.2	+0.4	62	+5
Middle slope.....	73.9	+4.0	+13.5	2.33	-0.80	-2.00	3.7	-0.3	59	-1
Southern slope.....	78.0	+0.8	+6.1	1.84	-1.00	+0.40	3.8	0.0	42	-2
Southern Plateau.....	76.7	-0.9	+3.8	0.65	+0.30	+0.20	2.8	+0.8	40	+13
Middle Plateau.....	63.3	-1.9	+9.1	1.43	+0.90	+0.80	3.8	+0.5	46	+0
Northern Plateau.....	61.7	-3.2	+14.5	1.44	+0.30	-0.90	5.3	+0.7	54	+3
North Pacific.....	56.8	-0.8	+13.7	1.94	-0.10	+0.10	5.7	-0.4	77	+1
Middle Pacific.....	60.5	-2.1	+8.0	0.79	+0.40	-0.40	3.9	+0.6	66	+1
South Pacific.....	65.6	-0.5	+14.3	0.14	0.00	+3.80	3.4	+0.1	68	+2

CONDENSED CLIMATOLOGICAL SUMMARY.

In the following table are given for the various sections of the climatological service of the Weather Bureau the monthly average temperature and total rainfall; the stations reporting the highest and lowest temperatures with dates of occurrence; the stations reporting the greatest and least total precipitation; and other data, as indicated by the several headings.

The mean temperature for each section, the highest

and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperatures and precipitation are based only on records from stations that have 10 or more years of observations. Of course the number of such records is smaller than the total number of stations.

Summary of temperature and precipitation, by sections, June, 1914.

Section.	Temperature—in degrees Fahrenheit.						Precipitation—in inches and hundredths.					
	Section average.	Departure from the normal.	Monthly extremes.				Section average.	Departure from the normal.	Greatest monthly.		Least monthly.	
			Station.	Highest.	Date.	Station.	Lowest.	Date.	Station.	Amount.	Station.	Amount.
Alabama.....	83.1	+5.1	Maple Grove.....	109	26	Lock No. 4.....	51	11	Eufaula.....	8.64	Cochrane.....	0.10
Arizona.....	76.1	+1.0	Sentinel.....	119	27	2 stations.....	28	3†	Paradise.....	2.38	3 stations.....	0.00
Arkansas.....	82.3	+5.1	Wiggs.....	109	28	Dutton.....	52	28	Huttig.....	3.77	Alila.....	0.00
California.....	66.4	-2.6	Greenland Ranch.....	124	29	Summit.....	20	5	Magalia.....	5.57	32 stations.....	0.00
Colorado.....	62.4	+1.1	Holly.....	102	13†	Aspen.....	20	15	Sedgwick.....	6.22	Fraser.....	0.40
Florida.....	81.9	+2.4	Middleburg.....	107	24	Griffin.....	58	6	Archer.....	9.19	Sand Key.....	0.14
Georgia.....	82.2	+4.4	Waynesboro.....	109	25	Gainesville.....	51	19	Valdosta.....	8.75	Canton.....	0.78
Hawaii [for May].....	71.1	-1.7	Waialua.....	91	24	Waimea.....	52	6	Waikamoi.....	60.68	Waianae.....	0.68
Idaho.....	58.8	-1.7	Glenns Ferry.....	106	18	Pierson.....	14	6	Castle Creek.....	4.97	Arrowrock.....	0.32
Illinois.....	76.5	+3.8	2 stations.....	105	24†	Sycamore.....	37	18†	Yorkville.....	7.82	East St. Louis.....	0.09
Indiana.....	75.0	+3.7	2 stations.....	108	10†	Auburn.....	38	20	Marengo.....	5.74	Elliston.....	0.26
Iowa.....	72.2	+3.1	do.....	101	9†	2 stations.....	40	9†	Osage.....	13.24	Bonaparte.....	1.17
Kansas.....	78.2	+5.4	Santa Fe.....	109	28	Irene.....	40	9	Valley Falls.....	10.92	Saint Francis.....	0.23
Kentucky.....	78.3	+3.2	Beaver Dam.....	108	24	Farmers.....	45	17	Richmond.....	5.54	Blandville.....	0.26
Louisiana.....	83.4	+4.4	Liberty Hill.....	108	30	2 stations.....	60	1†	Robeline.....	6.40	2 stations.....	0.40
Maryland and Del.....	72.3	+1.5	Cumberland.....	110	25	Deer Park.....	24	16	Princess Anne.....	10.00	Delaware City.....	1.27
Michigan.....	63.6	+0.6	Mount Clemens.....	99	9	Chatham.....	28	19	Adrian.....	10.83	St. Ignace.....	1.23
Minnesota.....	64.6	+0.1	Farmington.....	97	8	Roseau.....	59	20	Grand Meadow.....	14.45	Winton.....	1.45
Mississippi.....	83.3	+4.7	Columbus.....	108	26	Duck Hill.....	43	17	Shubuta.....	6.99	Clarksdale.....	T.
Missouri.....	79.3	+6.2	2 stations.....	106	23†	2 stations.....	24	22	Kidder.....	7.31	St. Louis (1).....	0.10
Montana.....	58.4	-1.0	Chinook.....	101	2	Bowen.....	24	22	Poplar.....	8.62	Belton.....	1.49
Nebraska.....	72.3	+3.0	Ewing.....	106	20	Harrison.....	36	29	Calro.....	12.10	Harrison.....	0.38
Nevada.....	62.0	-3.1	Leeland.....	114	14	Elko.....	12	6	Rebel Creek.....	3.91	Fahrump.....	0.09
New England.....	63.7	-1.7	Norfolk, Mass.....	97	25	Patten, Me.....	24	4	Presque Isle, Me.....	4.80	Provincetown, Mass.....	0.55
New Jersey.....	68.5	-0.8	3 stations.....	93	8†	Woodbine.....	35	17†	Belvidere.....	4.85	Woodbine.....	1.09
New Mexico.....	69.5	+0.3	Lordsburg.....	106	29	Elizabethtown.....	25	9	Pinos Altos (near).....	5.21	Los Lunas.....	0.10
New York.....	63.6	-0.9	Mount Hope.....	99	25	4 stations.....	29	6†	Adams Center.....	7.30	Oswego.....	1.36
North Carolina.....	77.2	+3.6	Greensboro.....	104	11	Banners Elk.....	47	1	Rockingham.....	7.80	Settle.....	0.95
North Dakota.....	62.2	-0.9	3 stations.....	93	2	Hannah.....	29	18	Carson.....	13.28	Pembina.....	2.43
Ohio.....	71.1	+1.9	Syracuse.....	104	25	2 stations.....	33	17	2 stations.....	6.33	2 stations.....	1.15
Oklahoma.....	81.1	+5.4	Newkirk.....	109	19	Kenton.....	46	9	Pawhuska.....	3.98	do.....	0.00
Oregon.....	59.0	-0.7	Umatilla (2).....	102	16†	Cliff.....	14	5	Headworks.....	5.39	Hermiston.....	0.22
Pennsylvania.....	65.5	+0.6	Uniontown.....	101	11	Pocomo Pines.....	25	6	Somersett.....	7.05	Erie.....	1.17
Porto Rico.....	77.5	-0.8	3 stations.....	94	7†	Albionto.....	54	2†	Rio Grande (El Verde).....	24.34	Hac. Isidora.....	0.41
South Carolina.....	81.1	+3.4	Blackville.....	108	25	Trenton.....	50	18	Ferguson.....	7.67	Clemson College.....	0.26
South Dakota.....	67.5	+1.6	Cottonwood.....	101	25	Camp Crook.....	33	7	De Smet.....	13.66	Custer.....	1.04
Tennessee.....	80.4	+6.3	2 stations.....	108	25†	Rugby.....	45	1	Liberty.....	7.62	Covington.....	T.
Texas.....	81.1	+1.3	do.....	107	28†	Spur.....	48	3	Sonora.....	8.16	15 stations.....	0.00
Utah.....	62.2	-2.2	4 stations.....	104	26†	East Portal.....	11	7	Erekson.....	4.42	Hurricane.....	0.45
Virginia.....	74.0	+2.6	Ivor.....	103	12	Dale Enterprise.....	40	3	Swetnam.....	6.90	Max Meadows.....	0.21
Washington.....	59.6	-1.0	Eltopia.....	107	16	2 stations.....	25	21†	Cedar Lake.....	7.30	Fort Simcoe.....	0.01
West Virginia.....	72.0	+3.0	Point Pleasant.....	104	24	Bayard.....	30	17	Cortland.....	5.98	Bluefield.....	0.62
Wisconsin.....	64.0	-0.9	Sheboygan (3).....	93	8†	Sturgeon Bay.....	29	16	Hancock.....	11.75	Prairie du Sac.....	3.27
Wyoming.....	57.3	+0.2	Fort Laramie.....	100	19	2 stations.....	18	7†	Alta.....	4.03	Wheatland.....	T.

† Other dates also.